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THE JOURNAL OF GEOGRAPHY

A MAGAZINE FOR TEACHERS

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ANNOUNCEMENT

The papers which follow are the outgrowth of studies made by a group of instructors and graduate students in the Department of Geography in the University of Wisconsin. As originally prepared, the papers were much longer and more detailed than the ones that are here published. In the limited space available in a single issue of the *Journal of Geography*, only a few of the papers can be published and they are much abridged.—EDITOR.

GEOGRAPHIC FACTORS AFFECTING THE GROWTH OF AMERICAN CITIES—A SYNOPSIS

R. H. WHITBECK

COMMERCIAL CENTERS

1. American cities have no long historical past as European cities have. The growth of existing European cities has been accelerated or retarded by an endless series of political and historical influences. American cities have almost no past. They have all grown up in response to very much the same influences and they are among themselves far more homogeneous than European cities. There are variations among them, but these variations are within relatively narrow limits.

2. All American cities of much importance have grown up in response to two sets of geonomic forces, which may be termed (1) the commercial, and (2) the industrial.

3. State capitals are usually located by other influences, usually the demand for centrality; and a few cities (Atlantic City, Los Angeles) for special reasons.

4. Most American cities that have had a vigorous growth owe that growth to the same general causes; they are either (1) at focal points on natural routes of travel and traffic, or (2) they have become focal points in our railway net.

5. Men collect in cities for (1) protection (in the past); (2) politics (in Latin America but not so much in the U. S.); (3) pleasure; (4) profit.

6. Nearly all American cities began as local centers for conducting buying-and-selling operations; centers for collecting and shipping the products of the region, and for receiving and distributing goods demanded by the region; that is, middlemen's centers.

7. Sites favorable for such activities were: (a) advantageous points along the water courses used by explorers, pioneers, and settlers; (b) points

convenient for the fur-trade (Montreal, Detroit); (c) places selected for army posts because of their strategic location (Chicago, Green Bay); (d) focal points along the lines followed by the "Westward Movement" (Pittsburgh, Cincinnati, Detroit, Milwaukee, St. Louis); (e) Junction points which facilitated the collecting and forwarding (usually by water) of pioneer products, and the return distribution of needed goods (points on the main waterways). All of these fall into one general class, namely, *focal points on routes of travel and traffic.*

8. Such sites would be—for inland cities: (a) At the junctions of rivers (or valleys)—Albany, Pittsburgh, St. Louis, Cincinnati; (b) At the mouths of streams flowing into the Great Lakes; places offering harbors for the loading and unloading of boats. Nearly every city or town of any size on the Lakes is at the mouth of a stream. (c) Many of the sites in (a) and (b) later became the termini of canals (Cincinnati, Buffalo, Cleveland, Toledo, Chicago). (d) At important river crossings (fords, ferries, bridges), at falls or rapids (Louisville), or at important bends in rivers where overland routes branched off from the river (Cincinnati, Kansas City). (e) (Later) at places where water routes and rail routes meet. For sea coast cities—(f) Natural harbors—usually the drowned mouths of rivers (Boston); (g) still better, if the river is itself a waterway of some importance (Philadelphia); (h) and still better, if the harbor is the natural water-gate of a large and productive hinterland capable of supplying and absorbing a large volume of sea-borne goods (New York).

BUT, the later and greater growth of American cities has been more largely due to industrial than to commercial factors.

INDUSTRIAL CENTERS

The General or Regional Site

1. The major influence in the growth of modern American cities is *manufacturing*—the growth of factories and mills employing great numbers of people.

2. Successful manufacturing in a given place, in addition to able management, involves (a) the economical assembling of materials; (b) the availability of labor; (c) ability to obtain power at reasonable cost: (d) an elastic supply of capital for permanent and for seasonal needs; (e) fair cost of land and non-burdensome taxes; (f) good transport facilities for the distribution of products. Many sites offer these advantages, hence we have many prosperous cities.

3. Cities tend to specialize in certain lines of manufacturing for various reasons; (a) tradition or early start (textile centers in New England); (b) special labor conditions (silk centers of N. J. and Penn.); (c) nearness of raw materials (packing centers of Middle West; Minneapolis); (d) important mining centers (Scranton, Butte, Birmingham); (e) easy access to a large consuming population including facilities for export (eastern cities generally).

4. The larger the number of advantages possessed by an urban site, the more its growth is stimulated, but good transportation is essential in all cases. Inland water transportation, except on the Great Lakes, has ceased to be important.

5. In general, manufacturing concerns locate in cities because they require a constant and varied line of *services* which can best be secured in large centers of population.

6. There is a marked tendency to locate new manufacturing plants just outside of large cities because of lower cost of land and lower taxes.

The Specific or Local Site

1. If the general or regional site is highly favorable, as it is in the case of New York and Chicago, the local or specific site may have many disadvantages, and yet may be dominantly advantageous. New York has serious local problems, especially problems of transportation; and the site of Chicago was a swamp, yet they have prospered beyond all other American cities.

2. Local sites that are dominantly advantageous may have a number of serious disadvantages, and yet the city may prosper. (a) Pittsburgh—narrow valleys and rivers cause great congestion of railway lines. (b) New Orleans—very low; serious problem with water supply, sewage system, foundations, basements, etc. (c) Seattle—steep hills and lack of level land for business section. (c) San Francisco—on a peninsula, preventing direct access by most railroads.

Advantageous Features of Local Sites

1. Room to grow; preventing the undue rise of land values in the city (Philadelphia, Cleveland, Detroit).

2. Attractive upland section for residences and parks (Cincinnati).

3. Lowland section with inexpensive land for factories and railway yards (consider swampy section of Milwaukee and Newark).

4. Good drainage features (consider the sewage problem of Chicago and New Orleans).

5. Pure and readily obtainable water supply (Great Lakes cities).

6. Agreeable and invigorating climate (contrast northern and southern cities).

7. Water power (Minneapolis, Rochester, Paterson).

THE PORT OF NEW YORK

JOHN W. FREY

New York City is above everything else a *port*. It holds the position of financial center and greatest manufacturing city of the United States, and various other firsts, primarily because it is, and has been for over a hundred years, the leading port of North America. Characteristic of many institutions

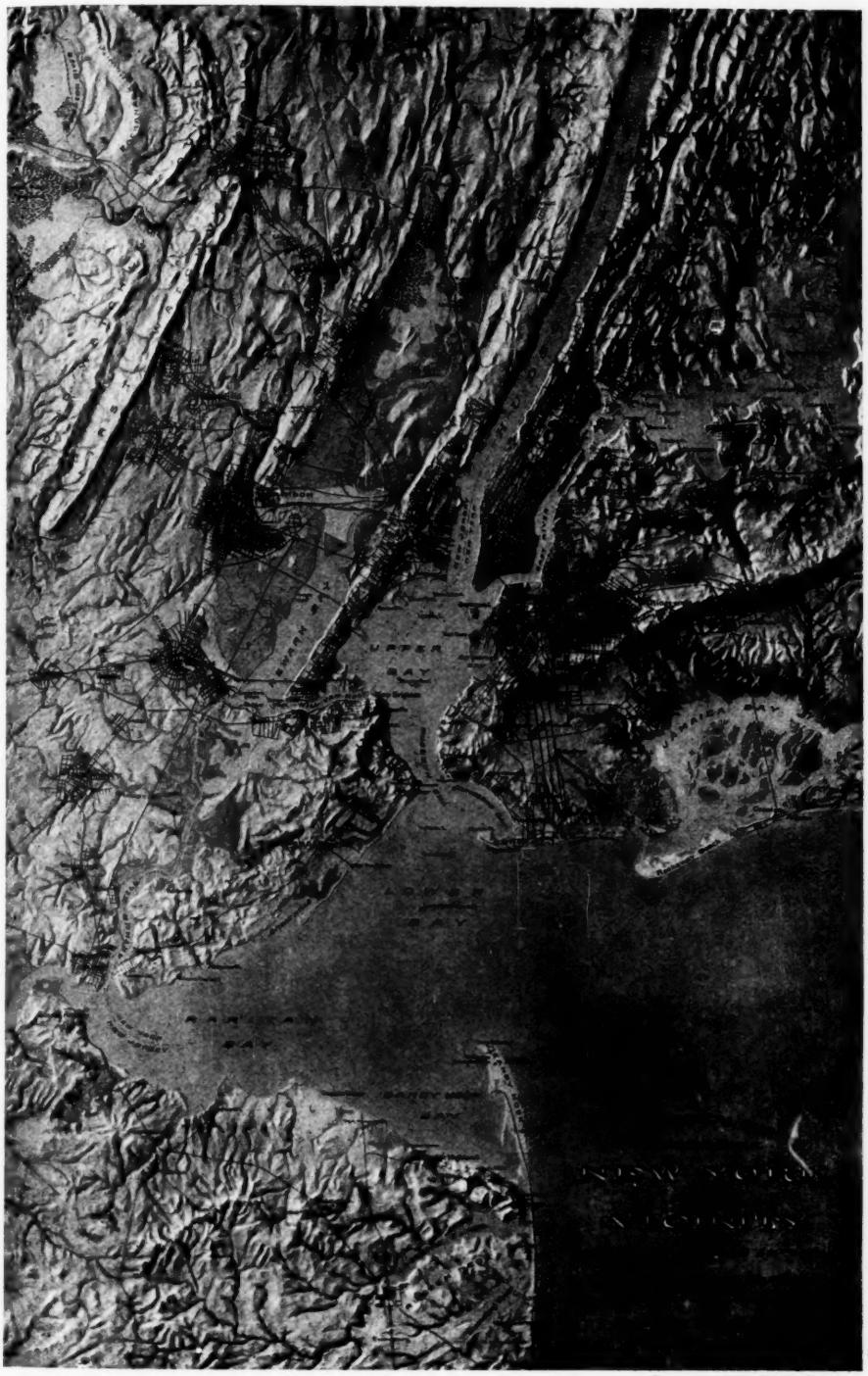
that have come to have very complex functions, it is difficult to say just what factors of geography are effective in the present situation, without considering them as they have reacted in the formative process. It is therefore desirable to consider the geographic factors which have influenced the growth of the port of New York from the time of Henry Hudson to the present.

GEOGRAPHIC INFLUENCES IN EARLY NEW YORK

It is perfectly obvious that somewhere near the mouth of such a waterway as the Hudson River there was bound to be a port. There is no doubt that Henry Hudson appreciated the commercial possibilities of the Hudson River, and of the location of Manhattan Island, for his reports were so favorable that a number of independent traders located trading posts on the island even before the establishment of the Dutch West India Company in 1621. The island appealed to the early settlers for a number of reasons: (1) because of its insularity it offered a certain degree of protection from the Indians; (2) the Upper Bay afforded a protected body of water for ships at anchor; (3) the island was well located with respect to inland and protected waters; (4) it was but a short distance from the open ocean, and is reached by an easily navigable entrance; and (5) altho ships of that day were not of deep draft, still the deeper water which surrounded Manhattan, as compared with the shallow water of the Jersey side, was an important consideration.

The lower east side of the island was developed earlier than the west side. This seems to have been due to the influence of rich farm lands on Long Island; besides, floating ice did not inconvenience navigation on the East River to the same extent that it did on the Hudson River.

It has frequently been maintained that New York was not so large as either Philadelphia or Boston prior to the American Revolution. In an attempt to explain this the suggestion has been offered that the hinterland of New York was not so great as that of either of the other two ports. When it is recalled that overland travel of that period was accomplished only at heavy cost, and that the important highways were waterways, it only requires that one study the map to see that the territory opened up by the Hudson River, Long Island Sound, East River, and its inlets, Newark Bay, Raritan Bay, together with tributary rivers and inlets, was greater than similar water routes open to Boston or Philadelphia. If New York was smaller than the other two cities it appears that it must have been due to human not geographical limitations. At any rate, regardless of the size and the importance of the port immediately prior to the Revolution, and in spite of suffering a complete commercial paralysis and depopulation to the extent of about fifty per cent during the war, the first census of the United States in 1790 gave New York the first position in population and second in commerce.



Courtesy, Am. Geog. Soc.

IMPORTANCE OF THE HUDSON-MOHAWK VALLEY AND THE ERIE CANAL

Soon after the beginning of the nineteenth century the Indian menace in the Mohawk Valley was eliminated, and westward expansion along this route began. The advantages of the Hudson-Mohawk route caused New York to be the favorite port for those immigrants who expected to make their way into the Great Lakes region. Hulbert says that travelers of this early period were struck by the promise which New York harbor gave of becoming one of the finest in America, and not a few of them gave expression to their belief in the future greatness of New York. He goes on to say: "These prophesies taken in connection with the investment of eight millions of dollars, which New York made in toll roads in the first seven years of this new century, incline one to believe that the influence of the Erie Canal as a factor in the development of the city may have been unduly emphasized, great though it was." Nevertheless the construction of the Erie Canal gave New York the advantage over all other ports with respect to the Great Lakes region and with its completion began the tremendous growth of the port concomitant with the development of the Middle West. Manhattan Island had a distinct advantage in the commerce of that day, for canal boats loading at Buffalo could make their way to the side of any ship within the port, regardless of where that ship happened to be berthed. Many seem to lose sight of the fact that the commerce of New York grew up with canal traffic, and that the city was exceptionally well situated with respect to any and all forms of water-borne traffic.

Previous to the construction of the canal the cost of transportation from Buffalo to New York City was $100 a ton, and the ordinary length of the trip was twenty days. On the opening of the Erie Canal the cost of freight fell according to its class, to between $15 and $25 a ton, and eventually to a much lower figure, and the time of transit was reduced to eight days. Rates from Ohio to the seaboard were reduced until they were one-tenth of their former figure. The entire western lake district was given an outlet for its products. The building of the Erie Canal established an economic bond between the East and the West, and between the West and Europe.

Transatlantic traffic was brisk and profitable. Then, for practically the first time in the history of ocean commerce, did the density of traffic over one route become sufficient to justify frequent regularly scheduled ocean voyages. Not only that, there grew a demand for a package service, in response to which developed the packet ships which were the progenitors of the modern line ship. Fully a decade before the Civil War the Cunard Line had made New York its main American terminal. The immigrant route to the West via New York, the outlet for American agricultural products thru New York, and the demand of the growing population of the United States for the manufactures of Europe, made the port the focus of the various ocean shipping lines as they came into existence. New York became the premier

American port because it was the ocean terminal of the Erie Canal Route, and this early advantage gave it such a momentum that its growth continued unabated after the canal became unimportant.

THE NEW YORK "PORT PROBLEM"

New York never has had the problem of getting traffic, and for fifty to seventy-five years after the construction of the canal it did not have anything serious in the way of a port problem. The so-called New York port problem was not generally recognized until the port was burdened with an enormous volume of ocean freight during the Great War.

The first railroads built in the United States were not much more than local lines. They were short, disjointed, and built apparently without any conception of ever connecting distant places. When it gradually did dawn on the intelligence of railroad men that railroads might compete with the inland waterways, they began the development of thru lines by consolidating some of the existing short lines and filling in some of the gaps. These early railroad builders saw the necessity of reaching points where traffic had already been developed. The most important objective was to connect the Great Lakes region—particularly Lake Erie—and New York City, for within that route the greatest traffic was obtainable. One should not lose sight of the fact that it took the railroads many years to demonstrate that they were capable of competing successfully with the Erie Canal. In other words, the canal was at the outset the proved thing, while the railroads were the experiment.

GEOGRAPHIC FACTORS IN THE PORT PROBLEM

Now let us consider some of the geographic factors which have contributed to the present difficulty of handling the enormous traffic of New York Harbor, for this is its port problem. A survey of the physiography of the region demonstrates that from the West the port may be approached in only one of two ways, either along the banks of the Hudson River, or across New Jersey. The New York Central Railroad has not found it difficult to hold control of the east side of the Hudson (The West Shore Railroad, now controlled by the New York Central, was not completed until 1885). On the Island of Manhattan there is a pertinent reason for the lack of railroad development, namely the lack of room. Even the New York Central, which at one time had its freight station at 14th Street, has been gradually pushed northward until today it possesses relatively few advantages over the New Jersey railroads. Besides the lack of room, the limited character of the approach to the island from the North is very marked. If you examine the topography of Manhattan you will notice that for railroads coming in from the north there are only two ways open. One route is to follow along the narrow ledge at the foot of the highlands on the east side of the Hudson River; the other is to skirt the highlands on the east side of the Harlem River to 160th Street, from which

point penetration of Manhattan is possible. Both of these routes are controlled by the New York Central.

Considering the west side of the river, a strong topographic influence is discernible. From Haverstraw to Weehawken there is, with the exception of a notch between the Reading Prong and the Palisades at Piermont, a formidable barrier to east-west traffic. Not only that, there is little land between the river and the Palisades. The available water front area on the Jersey side is very limited. It begins at Kings Point where the Palisades retreat westward producing a wedge-like lowland which at Cumminpaw, four and one-half miles below Kings Point, is two miles wide. It is in this area that all of the New Jersey roads terminate. This area is so limited that the railroads have been forced to build their break-up yards in the Meadows back of the Palisades.

REASONS FOR THE CONGESTION OF TRAFFIC

The problem of the railroad is not solved when the freight is delivered on the west bank of the Hudson. Since the canal boats, with which the railroads had to compete, would readily deliver goods directly into Manhattan, or along side of any vessel in the port, it was necessary for the railroads to offer the same kind of service. Hence there developed lighterage service, car ferries, ferry boats, and water front freight stations. As New York grew, more terminal facilities were required to meet the demands of the domestic and foreign traffic. The port of New York has arrived at something of a dilemma. The port has acquired a large population, and meeting its domestic demands congests the port facilities which are used for foreign commerce. That is, every type of terminal facility for both domestic and foreign commerce must occupy the same water front.

It might appear that Manhattan should have no problem in accommodating these functions because it has many miles of water front. Nevertheless, the problem is serious largely because of the limited water front that is actually available. East River north of Corlears Hook, Harlem River, and Spuyten Duyvil are not suitable for piers for large vessels, because these streams are too narrow, winding, and filled with treacherous currents. The Hudson River frontage, with the exception of two places where traffic is brought to the river, namely, Dyckman Street, and Manhattan Avenue (129th Street) is too narrow and steep-banked from Spuyten Duyvil to 72nd Street to permit the construction of terminal facilities. This means that, with the exception of traffic in coal, building materials, and other crude commodities handled on East River and Harlem River, all of the foreign and domestic commerce of Manhattan is concentrated between 59th Street and the Battery, and from the Battery to Corlears Hook—a distance equal to less than one-fourth of the total bulkhead length of Manhattan. What has made the congestion particularly bad is the location of railroad freight pier stations along the Hudson River between 42nd Street and the Battery. Since practically all of the

domestic package freight has to move thru these stations, there tends to be created a very great density of truck traffic along the marginal street. It has been estimated that the delays occasioned by these knots of traffic cost the city millions of dollars annually.

PROPOSED IMPROVEMENTS

It must be obvious that in order to secure the greatest efficiency in freight movement the water front must be freed of railroad pier stations and the traffic must be more widely distributed. To solve the problems incident to the further development of the port, the New York, New Jersey Port and Harbor Development Commission has been constituted. Without going into detail as to their plans and recommendations, several of the most important from a geographic point of view are: (1) to construct an automatic-electric system by which the railway freight terminal would be located in New Jersey, where the freight cars would be unloaded onto special trucks, which would in turn be placed on the automatic-electric cars. These cars would run without manual control thru tunnels to any one of a dozen strategically located freight terminals on Manhattan. The cycle is reversible. (2) To facilitate interchange of cars between all railways within the port by a belt-line railroad system and joint car-float and joint lighterage stations. (3) To make better use of the water front by replacing old and inadequate narrow piers by a smaller number of wider piers with wider slips. And (4) to develop other sections of the port, for example, Staten Island, Jamaica Bay, the shores of Arthur Kill, and the Raritan River.

The big step forward in this plan comes thru a recognition of the geographical and economic unity of the Port district, with a conciliation of the political elements.

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PHILADELPHIA

RALPH H. BROWN

LOCATION AND EARLY GROWTH OF PHILADELPHIA

Philadelphia's site, one hundred miles from Delaware Bay, at the confluence of the Schuylkill and Delaware Rivers was deliberately selected. Before the Quakers left their mother country, William Penn gave written instructions to his commissioners concerning just what geographic features to look for when they should be confronted with the problem of where to locate Philadelphia. These instructions, which are a study in seventeenth century geography, were: "Let the rivers and creeks be sounded on my side of the Delaware River, especially Upland, in order to settle a great Towne, and be sure to make your choice where it is most navigable, high, dry and healthy. That is where the most ships may best ride, of deepest draught of water, if possible to Load or unload, on ye bank or key side, without boating or litering of it. It would do well if the river coming in ye creek be navigable, at least for boats up into ye country, and yt the Scituation be high, at least dry and Sound, and not swampy, which is best determined by diging up two or three Earths and seeing ye bottome. Such a place being found out, for Navigation, healthy Scituation and good Soyle for provision, lay out ten thousand acres contiguous to it in the best manner ye can as the bounds and extent of the Libertyes of said town."

By far the greater number of large cities and towns have developed from small communities which were founded without reference to future growth; Philadelphia, on the contrary, was originally planned as a city. In the manner of the selection of its site, Philadelphia is quite unique among American cities.

That the final choice of the commissioners was based upon the requirements outlined to them is evident. Here the Delaware River is wide and deep, making a most favorable place for a port. Here the Delaware is joined by the Schuylkill, which is navigable for small boats. Fairly good soil is to be found in the vicinity, and over most of the city the land is high and dry. In one respect was their selection unfortunate, but this only for the time being. During the early growth of the city, epidemics of yellow fever (then popularly called Barbadoes distemper) were of common occurrence in the hot, sultry summer days; and at each recurrence large numbers died. But for the last century Philadelphia has been free from these or similar visitations.

The site, being finally selected, the building of "Penn's greene town" immediately began. Ten parallel streets of equal width leading north and south were intersected at right angles by ten similar streets. The four square miles of the city of Philadelphia of Revolutionary times must have looked very much like an enlarged checker-board. This regularity of planning has been adhered to quite closely as the city has expanded, so there is

probably no other American city which retains so many of its early characteristics as does Philadelphia.

As a natural result of its many geographic advantages, the city grew quickly from the very beginning. Not only this, but commerce and manufacturing developed surprisingly early. Altho founded fully fifty years later than Boston and New York, Philadelphia soon came to be the principal city and the first industrial center of the colonies. By 1685 (the city was founded in 1682) 600 houses had been built for its population of 7,000. Counting the Swedes in Passayunk and Chester—who had preceded the Quakers by nearly half a century—the total population on the west bank of the Delaware in 1685 was 9,000. Philadelphia has, from the earliest times, been a city of homes, due in large part to the fact that its growth is limited in only one direction, and land at reasonable rates is available.

As might be expected, the settlement of the city did not follow city lines, but was prompted by commerce. Outlying centers of population began to develop. Having no unified control, these conflicting townships interfered with the maintaining of public order and riots were of common occurrence. In 1854 the Legislature passed a bill which made Philadelphia City coextensive with Philadelphia County by welding the twenty-eight jurisdictions into one municipality. The area of the city was thereby increased from four to two hundred thirty-two miles and its population was increased by about 4,000.

Reasons for Early Development

The early geographic advantages of a city deserve fully as much comment as those which foster its later growth. Especially is this true of Philadelphia, for in spite of changing geographic conditions there remain evidences of factors which, while they laid the foundation for the future city, are today either inoperative or of less significance than formerly.

The early commerce of Philadelphia is frequently overlooked in economic discussions of that city. As a point of export and import it overshadowed other eastern ports until the first part of the nineteenth century, when, as a result of the War of 1812, foreign trade along our whole coast suffered great reversals. Later, the value of the Great Lakes as a waterway was enhanced by the construction of the Erie Canal, and most of the products of the West began to go to New York thru the Mohawk Valley. Philadelphia never regained its former relative position in foreign trade, but its extensive early commerce was a great factor in the economic life of the city.

It was the existence of water power that gave manufacturing its first grip upon Philadelphia, but this is a geographic factor that has passed almost entirely out of existence. Of its early importance too much cannot be said. At the "fall line" about fifteen creeks develop small falls, and it was along these that the first shops were located. The principal centers for these early manufacturing industries were along the Schuylkill River and the Wis-

sahickon Creek, altho with the building of roads mills became dispersed over a wide area. Germantown, the most favorably situated for the utilization of water power, became the recognized knitting shop of the Colonies. In 1757, 69,000 pairs of stockings were sold from the city, and before the Revolution there were eleven mills on the Wissahickon. Ruined mills and abandoned waterwheels along the creeks near Philadelphia testify to this early industrial development, but when steam came into practical use, more advantageous sites along routes of transportation were sought by the manufacturers.

RELATION OF TRANSPORTATION TO GROWTH

In few states in the union has topography had so great an influence in determining the course of transportation as in Pennsylvania. The railroads seem to follow drainage lines, and in so doing the length of mileage is sometimes materially increased over airline routes, as the rivers are highly meandering. Among the many difficulties that the railroads encounter, is the crossing of the Allegheny Front west of Altoona, which greatly increases cost of transportation. Among the series of ridges that trend north and south in the Ridge and Valley province, there is no natural passage way of any considerable size or continuity to aid communications with the interior. These topographic conditions have had a lasting effect upon the economic life of Philadelphia, for the city is at a distinct disadvantage in comparison with other northeastern ports. The growth of the city probably has been retarded by surrounding physical conditions, for modern cities are dependent upon transportation more than upon anything else.

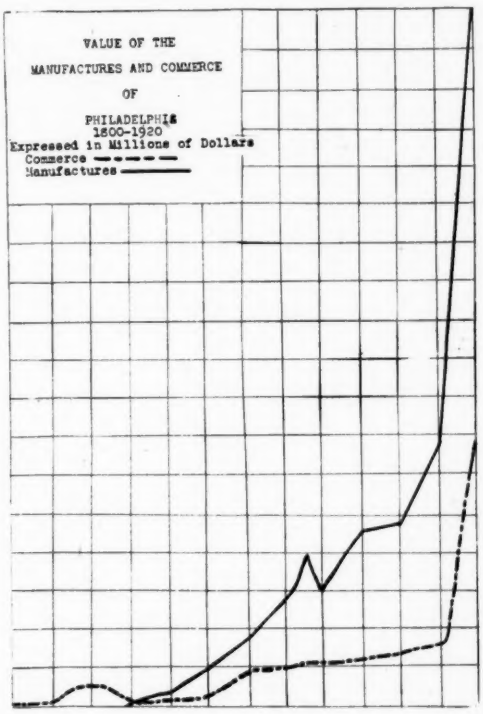
In 1832 a series of canals and portages, costing $10,000,000, was built to connect Philadelphia with Pittsburgh, this being the first effort of the people to regain the commercial leadership for Philadelphia. It failed in its original purpose, but did much to encourage commerce within the state. A direct result of this commercial fight was the creation of the Pennsylvania Railroad, which has grown to be one of the great railways of the country. This railroad links Philadelphia with the Middle West.

Philadelphia is also served by the Philadelphia and Reading, and by the Baltimore and Ohio railroads. The former is of particular significance as it penetrates the hard coal fields of the state, and, as the haul is not great, coal is comparatively cheap in the city.

The geographic factor most important to Philadelphia is the Delaware River, which might well be considered an arm of the ocean. It is the third port in importance in the country; sixteen miles of the water-front are in actual use, and four more can be developed commercially. As an aid to industries the port is today a vital factor. Many manufacturers have chosen Philadelphia as a site for their factories because of oceanic communications and the resultant cheap transportation. Raw materials are imported and delivered directly to the factories, some of which are situated on the river banks. Quantities of finished products make up the list of goods shipped in the extensive coast-wise trade of Philadelphia.

INDUSTRIAL PHILADELPHIA

There is hardly another city in the world more dependent upon manufacturing industries than Philadelphia. The annual per capita production of these industries amounts to practically one thousand dollars. The total number of persons engaged in all industries and occupations is well over seven hundred thousand, ten per cent of whom are employed in the textile mills, and over eight per cent in the iron and steel establishments. Besides this, four thousand people are engaged in the tanneries. The industries are greatly diversified, and those which are most important to the city have resulted from a combination of geographic conditions.



Textiles and allied products, Philadelphia's earliest endeavor and now its most characteristic industry, makes up twenty-five per cent of the total value of manufactured products. The skilled hands of the early settlers soon had the raw materials to work with, for flax and wool were produced in the immediate surroundings. For power the mills depended upon the numerous creeks until the more economical steam came into use. The humid atmosphere of the region was also a factor in the locating of cotton mills there. When domestic supplies of raw materials became insufficient, they could be brought in cheaply from producing regions. Labor has always been at hand; immigrants furnish the main source of labor for the clothing manufacturers, while skilled labor is abundant. Rug-making, an industry in which Philadelphia leads all others, seems to owe its origin to the early Scotch settlers who were skilled in this art.

The early importance, and the later decline of iron and steel manufacturing in Philadelphia, reflect in a striking way the dependence of industries on geographic conditions. During the years when charcoal, and later, anthracite coal, were used as fuel, the city was most favorably situated, and, as a result, was until 1883, the country's principal source of these products. But when anthracite was, in turn, superceded by coke made from bituminous coal, the iron industry began to center in the Pittsburgh region,

for this industry is one which concentrates near the fuel. Even with these adverse conditions, Philadelphia is still one of the great metal products centers, and several large "independents" have located there to profit by the special advantages offered by the location.

One of the reasons why Philadelphia is the country's principal tanning city is that this industry got an early start there, in response to the availability of tanning derived from the nearby hemlock forests, and the hides which were in those early years produced in large quantities in the state. However, less geographic influences must be given to explain the present preeminence of the city in this industry.

Sugar refining is an example of those industries which originated and persist today because of the city's position on tide water. About twenty-five per cent of the sugar of the country is refined in this city.

The Delaware River is sometimes referred to as "The American Clyde." In the immense ship-yards of Wilmington, Chester, Camden, and Philadelphia, about one-quarter of the steel ships of the country are constructed, and twenty per cent of these are made on the Philadelphia ways. The proximity of lumber years ago, and of steel today, a comparatively mild climate which permits out-door work a great part of the year, a sheltered harbor not far from the sea-board, and the nearness to coal, explain this great industry.

It is interesting to note that during the World War the government selected Philadelphia as the base for its greatest ship-building activities, and built fifty ways at Hog Island. In them one-quarter of the ships contracted for during the war were constructed.

CLEVELAND

GEORGE E. WOOD

In 1776, General Moses Cleaveland, master surveyor, was commissioned by The Connecticut Land Company to negotiate with Red Jacket, Joseph Brant, Chief Cato, and other Indians of the Western Reserve, to survey "The Fire Lands" set aside by the General Assembly for the sufferers from British invasions, and to select a site for a settlement. He left three log cabins behind him on the right bank of the Cuyahoga ("crooked river"), and predicted that the new generation "might live to see a place as large as Old Windham." After 125 years, the settlement which did not have a post-office in 1800, has a population of 800,000 and boasts that it is the only city in the New World that stands as it was laid out by its founder, and bearing his name. Altho the human factor should not be ignored in arriving at the causes behind this phenomenal growth, yet, many of the more important answers to the question "Why is the Forest City the fifth in the land?" can be answered by a study of geographical factors—some general and some local.

THE SITE OF CLEVELAND

It may be noted that Connecticut did not relinquish its land claims in the West, because its Western Reserve was one of the most fertile and accessible districts on the western frontier. Since the dawn of history plains have been the principal theatres of human activity, for their climate is more agreeable than that of higher regions, and a greater part of the land is cultivable. Much of the Western Reserve of Northern Ohio is a smooth lake plain, having a fine soil in a humid climate.

The immediate site on a bluff, caused by the entrenchment of the Cuyahoga in the glacial drift and lake sediments at its junction with Lake Erie, was selected in accordance with two prime requirements of that day; namely, (1) water transportation and a fertile hinterland, and (2) a site that could be easily defended against the attacks of Indians or other enemies.

In spite of its favorable geographical situation, during the first two decades of the nineteenth century Cleveland was no more conspicuous than many of its neighbors; indeed, a geography of those days briefly described it as "a thriving village on the shore of Lake Erie, six miles from Newburgh," an expression that was unduly perpetuated by rival lake shore cities. After running the usual gamut of experiences incident to a frontier community, Cleveland in 1820 had a population of only 600, and was not of sufficient importance to warrant consideration in the same class with other cities like Cincinnati, Pittsburgh, St. Louis, or Buffalo.

ON NATURAL ROUTES OF TRANSPORTATION

But, if Cleveland was located where it is because of the agreeable climate and the fertility of the surrounding lake plains, it also owes its initial impetus to another adjunct of plains, namely, their levelness, which generally implies navigable rivers and the easy construction of routes of transportation and intercommunication. Canal building in Ohio was actuated by frontier conditions and was, of course, controlled by topographic features. Canals were demanded by the widely separated communities of Ohio for two main reasons; (1) the absence of roads, or the frequent impassibility of those that did exist, rendered production profitable only where produce could be shipped cheaply by water; and (2) the settlers who could make use of the river route to New Orleans found that market unsatisfactory because of the losses incurred on the way and the low prices that prevailed on account of the seasonal glutting of the market. When the demand for transportation facilities from the interior of the state to eastern markets resulted in five canal routes being surveyed, three of five feasible lines were eliminated by sectional jealousies, and it was ordained that the primary object of the canals should be to secure the greatest development of the state as a whole. Cleveland's first mayor, Alfred Kelley, was successful in having his town made the northern terminus of the Ohio and Lake Erie Canal, as the configuration

of the Cuyahoga's Valley made it a foregone conclusion that any canal projected across the eastern part of the state would reach Lake Erie by way of this graded and drift-filled valley.

The opening of the canal was the beginning of a great era in Cleveland's progress. For nearly twenty-five years the canals were a convenient and serviceable means of transportation. Besides developing the state commercially and agriculturally they furnished water power for small industries at a time when steam power was out of the question. More than 19,000 passengers arrived in Cleveland by canal in 1843, and its shopping district was given its first material expansion when journeying to Cleveland by canal became the vogue. New industries were started, wages increased, real estate rose in value, and Cleveland became the most important transshipping point between the Ohio country and the eastern markets, via Lake Erie, the Erie Canal, and the Hudson River.

Tho Cleveland received its first great impetus from the fact that it was made the terminus of the Ohio and Lake Erie Canal, the network of railroads that spread across the lake-shore states between 1850 and 1870 accelerated its growth still more. Already a lake-canal port, its strategic position along the "water-level route" from Chicago to Buffalo placed the city in a favored position for commerce and industry. Three railroads created business all along their lines, and gave Cleveland a large retail and a widespread wholesale trade with jobbers in a relatively densely populated region of ever-increasing buying power. They also stimulated industries; and factories replaced grain warehouses as the wheat-producing territory moved westward. With the passing of time eight trunk lines and a nineteen-mile belt line, encircling the city, have been supplemented by eight interurban lines and many surface car lines.

POSITION WITH RESPECT TO BASIC RAW MATERIALS

Until 1870 Cleveland's growth could be attributed (1) to its situation in a fertile interior plain that yielded abundant food-stuffs and factory materials and at the same time absorbed an increasing amount of manufactured products; (2) to its strategic site as a canal-lake transshipping point for this fertile hinterland; and (3) to its position as a center of railroads converging toward eastern markets and diverging toward productive fields and jobbing centers of the Upper Mississippi Valley. After that date its position with respect to the areas producing the basic manufacturing resources of petroleum, coal, and iron has played the foremost rôle in its development.

The industries that sprang up during the Civil War and later, prospered because of the proximity of these resources which determine whether a nation rises or falls in this age of steel. Cleveland's growing importance as a steel-working center, contrasted with the Pittsburgh district, is directly due to the utilization of the high grade Lake Superior iron ores, the greater part of which move eastward by the lakes to be transshipped at Cleveland or nearby ports.

The geographical influence of this ore movement is causing a westward migration of iron and steel centers, and the prestige of Pittsburgh is waning in favor of Lake Shore cities. The low gradients from the eastern interior coal fields, coupled with the new process of making coke from lower grade coals, place Cleveland at the natural junction of the most economical routes for collecting the raw materials of the iron and steel industry—ore, coal, and limestone.

Its twelve huge blast furnaces smelt an increasing proportion of the ore unloaded from the steel freighters at its docks; at present they require over two and one-half million tons of ore. Naturally, iron and steel products and allied foundry and machine products constitute Cleveland's leading manufactures. In the number of wage earners employed, cost of materials, value of product, and in the value added by manufacture Cleveland ranks as the fifth city. Among its most noted manufactured products are the steel freighters that ply on the Great Lakes carrying larger cargoes of grain, coal, and ore than most ocean liners. Many kinds of heavy machinery are produced that take the place of sailors or enable other men to do work more quickly and efficiently. The speedy freighters with mechanical loaders and unloaders permit the tonnage of the port of Cleveland to exceed that of Liverpool. Manufacturers boast that Cleveland-made rails and barb-wire encircle the globe. Cleveland now claims to lead all other communities in the manufacture of nuts, bolts, wire goods, gray iron castings, twist drills, steel forgings, hardware, plumbers fixtures, and job printers presses. Such automobiles as the Baker, Rauch and Lang, Chandler, Cleveland Six, Grant, Jordan, Owen, Magnetic, Peerless, Stearns, Templar, White, and Winton originate here—nearly a third of every dollar invested in automobiles and accessories in the United States is said to be paid to Cleveland.

COMMERCE AND FINANCE

Cleveland's 150 incoming and outgoing mails daily, coupled with ownership of four-fifths of the steel freighters on the Great Lakes and its abundant supplies of coal and oil have given its business men an advantage over competitors in many other cities. In competition with such cities as Pittsburgh and Cincinnati, Cleveland was chosen as the seat of the Fourth Federal Reserve Bank.

Considering that it is fifth in population, fifth in manufacturing, and fourth in financial importance, Cleveland is, on the whole, a remarkable example of a great economical unit of society whose present standing is largely a direct reflection of its geographical position with respect to the development of transportation facilities, commercialized agriculture, and basic manufacturing resources.

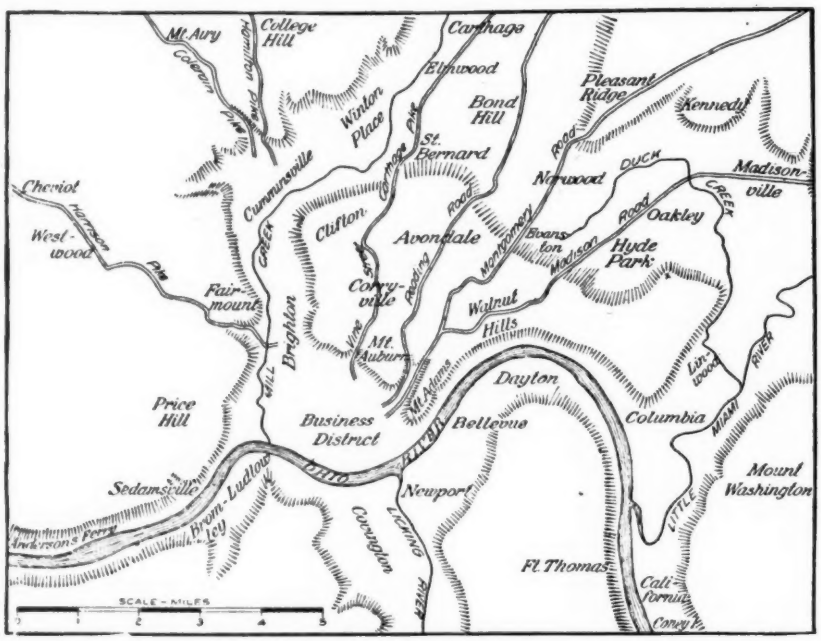
CINCINNATI

J. RUSSELL WHITAKER

Cincinnati is situated on a great northward bend of the Ohio River, and at the mouth of the Licking and the Little Miami rivers. The city covers a lowland basin of three square miles, and many square miles of the surrounding upland. Of utmost significance in the growth of the city have been the various valleys, large and small, that converge on the basin in which early Cincinnati was located.

SETTLEMENT

There is abundant evidence that the early settlers appreciated the advantages offered by the site of Cincinnati. Benjamin Stites, a Pennsylvania trader, in returning from an Indian pursuit, saw the rich valleys of the Big Miami and the Little Miami, and enlisted the interests of Judge J. C. Symmes,



The Site of Cincinnati

then Congressman from New Jersey, in a proposal to buy the land adjoining the Ohio and including the two Miamis. An address published in 1787, in an effort to interest his New Jersey neighbors, reveals something of the geography: "This land, bordering on the Ohio, is supposed to be equal to any part of the Federal Territory in quality of soil and excellence of climate. . . . Its situation is such as to command the navigation of several fine rivers. Boats are frequently passing this land as they ply up and down the Ohio.

There are no mountains in the tract, and, excepting a few small hills, the country is generally level and free from stones on the surface, but there are plenty of stone quarries for building. . . . It is said to be well watered with springs and several fine mill streams fall into the Miamis. Salt may be had in any quantity by water within a short distance at the salt works of the Licking."

One Mathias Denman purchased a tract of land from Judge Symmes, specifying that it should be as nearly as possible opposite the mouth of the Licking. It was his intention to found a town here, and to operate a ferry. In December, 1789, the founders of Cincinnati floated down to its site from Maysville, Kentucky.

GEOGRAPHIC FACTORS IN THE EARLY GROWTH

Clearly the greatest single factor in the early development of Cincinnati was its location on the Ohio River. Flowing toward the West from the older settlements in the East, the river became a main thorofare in the early westward expansion. To its head waters at Pittsburgh led the most frequented roads from the East, and down its course flat boats could float for nearly a thousand miles into the unsettled interior. The importance of the Ohio River is shown in the eager rivalry between Baltimore and Philadelphia to establish connections with it. On the same day, July 4, 1828, the two rival routes to the West, the Chesapeake and Ohio Canal, and the Baltimore and Ohio railroad started for the Ohio headwaters.

Cincinnati occupies a central and commercially strategic position in the Ohio River basin. The distance by water to the Mississippi River is 501 miles, and to the junction of the Allegheny and Monongahela, 458 miles. From Maumee Bay on Lake Erie to the Tennessee River is 400 miles, and Cincinnati is half way. Now it so happened that the early settlements, with the exception of the Blue Grass and Kanawha areas, were at the ends of these major lines—St. Louis on the Mississippi, Pittsburgh, at the confluence of the Allegheny and Monongahela rivers, and Knoxville on the Tennessee River. A centrally located city has a commanding advantage in commerce; and being centrally located on the Ohio, Cincinnati soon gained a strong hold on the trade along that most important of the early routes to the West.

The location of the site on the outside of a great northward bend in the river was also of significance. It was the point farthest north on the Ohio from which easy roads led to the unsettled Northwest, and it was the most favorable place for settlers to leave the river and proceed inland. Cincinnati was the outfitting center for these settlers. Further, the location on the outside of a great bend in the river increased the city's tributary area, making it the focal point of a considerable area of the surrounding country.

A highly important element in the geography of the region is the fact that several valley lowlands lead to Cincinnati from all directions like so many spokes in a great wheel. The little Miami Valley leads to the northeast, Mill

Creek Valley to the north, the Whitewater to the northwest, the Ohio to the east and west and the Licking to the south. These streams were first of prime importance for flat boats and steamers; later, the emigrant wagon found its way along the trails in these valleys. Canals, in time, found these lines the way of least resistance, but they were soon checked in their growth by railroads built along the same valleys.

These converging routes gave the settlement a commanding commercial position in an area of unexcelled fertility. The bed rock for a radius of 200 miles is largely phosphatic limestone and shale, and on weathering produces the rich Blue Grass soils. No less fertile were the alluvial bottom lands of the valley lowlands. It was the luxuriance of the Miami valleys that attracted the Pennsylvania trader, and convinced Judge Symmes of the region's future prosperity.

SPECIAL ADVANTAGES OF THE SITE

To the favorable conditions found in Cincinnati's general location were added special advantages of site. A large preglacial valley, now occupied by Mill Creek, joins the Ohio at this point. The Creek has cut its channel below the valley floor, forming a terrace on which the business section of Cincinnati is located. We may well speak of this terraced valley, some 400 feet below the upland, as the Cincinnati basin. The basin actually consists of two terraces, the first a narrow one at high water level, from which by a steep slope one mounts to the second, a broad flattish area, forty feet above high water, extending to the hills at the northeast, but grading to the northwest into the Mill Creek lowland. The conditions favoring the development of a city here were: The upper terrace provided room for 100,000 people, and guaranteed comparative freedom from floods. No other place along the Ohio could accommodate so many people without necessitating the climbing of bluffs. Secondly, there was abundant docking space for boats; a shore line of eleven miles. Third, numerous streams had graded ways from the basin to the surrounding upland, along which ways roads were early built.

STAGES IN THE DEVELOPMENT OF THE CITY

Having indicated the geographical advantages of Cincinnati, let us take up the city in its successive stages of development and note how the response to these environmental factors has varied from time to time. The history easily falls into three periods: (1) As an outfitting and trading center, 1790–1813; (2) As a river and canal town, the queen city of the West, 1813 to 1850; (3) As a railroad center, 1850 to the present.

Outfitting and Trading Center. Cincinnati occupied a highly strategic position on much used routes leading to the Northwest. This area was not free from Indian ravages until 1794, a circumstance giving Cincinnati time to become established before migration in that direction from the older settlements began. Expansion northward took the course of the rivers; in fact,

so generally was this true that a detailed population map of 1810 gives a clear picture, thru the distribution of population, of the river systems north of the Ohio River. Cincinnati was situated at the mouth of two of these waterways.

Manufacturing consisted in the conversion of bulky raw materials, such as corn and wheat, into more compact and more valuable commodities, such as whiskey and flour. An industry just starting and soon to grow rapidly was pork-packing. The hog-producing area was the oak forest of Ohio and Kentucky, and later, with the clearing of the forests, the corn lands of Ohio. Salt could be easily obtained from works on the Licking and Kanawha rivers, and it should be remembered that for meat-packing in those days, an easily accessible supply of salt was indispensible.

Canal and River Town. The period from 1813 to 1850 marked Cincinnati's most rapid development, and the chief factor in that growth was the steamboat. Altho the first steamboat passed Cincinnati in 1811, by 1825, 100 were arriving and departing each month. All packet lines on the Ohio made it their terminal. In 1832, 2231 arrivals were recorded, and 1847 saw the peak reached with 4007. Flat boats on the Miamis fed the river traffic to the extent of some 150 boats a year. Construction of the Ohio canals made the river all the more important. The time required for the New Orleans trip dropped from six months to about twenty-four days, with the result that Cincinnati as a river port became vital in the commerce of the West. With the exception of New Orleans, it was the largest city west of the Appalachians.

The two canals most directly influencing Cincinnati were the Miami-Erie and the Whitewater. The Miami canal, begun in 1824 and completed in 1842, followed Mill Creek to the Big Miami, thence to Lake Erie by the Maumee River valley; the Whitewater canal ran northwest to the Whitewater branch of the Miami.

The benefit of the canals was marked. The tributary area of the city was increased, the Miami Canal furnished water power sufficient to turn sixty pairs of millstones, and the growth of the city was stimulated by the prospect of new business. In the case of the Whitewater Canal, "Its building added twenty-five per cent to the value of real estate near the junction with the Ohio River, and caused the creation of a great number of neat and comfortable houses by those who anticipated employment and business from the canal when completed."

A third commercial advantage lay in the many macadamized roads, fourteen in 1851, radiating from the city. Their construction was made imperative by the early settlement of the surrounding upland, and was aided by the many naturally graded routes leading to the upland from the Cincinnati basin.

Character of the Early Trade. The character of the trade may be briefly noted. As early as 1815 one finds iron castings coming from Zanesville, Ohio; iron, salt, coal, and pine timber from Pennsylvania and Virginia; cotton, to-

bacco, saltpeter, and marble from Kentucky and Tennessee; and raw sugar, molasses, and cotton from Louisiana. In 1835, imports included 90,000 bbls. of flour, and 55,000 bbls. of whiskey; while out of $3,000,000 exports during one year $1,000,000 consisted of pork, $900,000 of flour, $600,000 of tobacco, $500,000 whiskey.

In 1840, of the total factory output of about $10,000,000, foodstuffs were $5,000,000, iron works $2,800,000, wood products $2,250,000, and leather $1,000,000. The mast fed hog had given way to the corn fed, and Ohio was the leader in the production of corn. There were abundant hardwood forests both near Cincinnati and upstream in what is now West Virginia, and these gave rise to wood-working industries and to the vehicle industry in which Cincinnati was a leader. A large part of the iron working consisted of making steam engines for boats, cotton gins, and sugar mills. In 1835 were built 22 steamboats, 20 sugar mills, 240 cotton gins, and 100 steam engines.

This was a period of rapid settlement in Ohio, and of course Cincinnati benefitted as the center of an expanding, growing population. At the same time, avoidance of prairie and marsh land in the northern and western parts of the state tended to hold settlers close to the Queen City.

A Railroad Center. The period from 1850 to 1890 was characterized by transportation changes to which the city was forced to adjust itself. With the building of railroads came the decline of canal and river traffic. The first railroad was the Little Miami, following the Little Miami Valley, completed in 1845; the second paralleled the Miami canal route to Dayton. The canal declined but revived somewhat following the Civil War, and was used for moving bulky commodities such as ice and stone until 1913, when it was destroyed by the Miami flood. At first, the railroads increased river traffic for they acted as feeders; when rail connections between important cities were completed, however, they became active competitors, with the result that the bulk of Cincinnati's trade in 1909 was by rail, the only river-borne commodity worthy of note being coal. The rise of the railroad has given other cities, such as Indianapolis and Columbus equal advantages in transportation with Cincinnati; and has partially robbed Cincinnati of benefits from the one condition most responsible for its early, rapid growth, its general position on the Ohio River.

Altho of much less relative importance than formerly, the Ohio River has continued to exert an influence on commerce. In 1908, the rail rate on coal per ton from the Kanawha coal field in West Virginia was $1.20 to Olive Hill, Lexington, and Winchester, Kentucky; but only $1.00 to Cincinnati. This advantage in rates has had the effect of making the coal field a part of the city's environment, with resultant benefits to manufacturing. Because of high switching rates, however, the towns near Cincinnati, but off the river, do not get their coal so cheaply.

The leading manufactures in 1909 in order of value were: meat packing, foundry products, malt and distilled liquors, men's clothing, boots and shoes,

printing, wood products. The most striking condition in manufacturing is the lack of specialization, due, doubtless, in a great measure to the diversified character of the tributary market area, including as it does not only a fertile farming region, but many flourishing towns and mining centers as well; and to the fact that the city now possesses no special advantage in securing any one particular class of raw materials, but is fairly well located with respect to many. Chicago forged ahead in meat-packing in 1860, Cleveland and other more northern cities have a superior location for iron and steel manufacture, and the hard wood forests of the Appalachain plateau, once a valuable asset, are disappearing. By the census of 1920 Cincinnati ranked thirteenth among the cities of the United States with respect to the number of persons employed in manufacturing; and fourteenth with respect to the value of the products of manufacture.

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THE TWIN CITIES—MINNEAPOLIS AND ST. PAUL

EARL DOW BROWN

In 1679 Father Hennipin, the intrepid priest-explorer, ascended the Mississippi and stopped at the falls of St. Anthony, which he named after his patron, St. Anthony of Padua. A few years later some French traders, looking for furs, paddled up the river to the foot of the falls just above St. Paul. This part of the country was rich in furs brought down the rivers from the North. Here a trading post was established and trade began with the Indians.

In 1805, the building of Fort Snelling seems to mark the starting point for the real growth of the Twin Cities. Minneapolis and St. Paul were situated at very advantageous positions, Minneapolis being at the southern point for boats coming down the river and also at the falls, and St. Paul being at the northern point for boats going up the river.

The upper Mississippi flowed thru a region thickly forested and capable of furnishing millions of feet of lumber which could be floated down the rivers to the source of power at St. Anthony Falls. Every spring the rivers were fairly choked with logs.

St. Paul had been named the territorial capital, and the government had been administered from this city with very little friction, but in 1848 when plans were being made for the location of the state capital, Minneapolis and Stillwater put in their demands; a compromise was effected which gave to St. Paul the capital, to Minneapolis the university, and to Stillwater the state

prison. Minneapolis became a milling city. The water power turned the wheels of both the saw mills and flour mills, and the river furnished the high way for log and lumber transportation. On the other hand, St. Paul was located a little farther south on the river at the terminus of transportation coming up the river, and it became a distributing center for goods going to the Northwest, and later a manufacturing and marketing center for the dairy products of Minnesota.

THE INFLUENCE OF THE SURROUNDING TERRITORY ON THE GROWTH OF THE TWIN CITIES

The growth of a western city is so closely related to the resources and conditions of its surroundings that it would not be wise to separate the city from the territory of which it is a center.

The development and growth of the Twin Cities run parallel with the development of Minnesota, North and South Dakota, southern Canada, and northern Wisconsin; and it is very natural that these cities should reflect the prosperity of this fertile region. Minnesota had its forests, the Dakotas have their fertile areas of wheat land, and the rivers rising in Wisconsin and Minnesota are capable of furnishing abundant power.

MINNEAPOLIS

The Influence of Lumber. After Minneapolis had become a small village, and the fur trade had furnished the few people with a means of livlihood, the lumber industry began its remarkable growth. The camps increased rapidly and the profits from previous years furnished capital for still larger enterprises. In 1848, 1,500,000 feet of lumber were cut; in 1851, 9,000,000 feet, and by 1857 the production had reached 45,000,000 feet. Logs were even used as money. The merchants supplied the logging companies with food, clothing, and tools, and in payment often accepted logs. The lumber industry was highly profitable, and there was a market for all the lumber that could be cut. The price ranged from $10.00 to $16.00 per thousand feet. Labor was cheap, and food was plentiful. The result was that profits were piled up, and the capital was invested later in the new manufacturing establishments.

Down to 1843 the lumber industry had been purely local, and the markets were local. Most of the lumber was used in Minneapolis, St. Paul, and Stillwater, in the building of the houses for settlers who were swarming into the settlements, and for the building of mills, booms, and stores. In 1843 an accident occured which influenced the growth of the lumber market. The boom at Stillwater, which held several million feet of lumber, went out, and the logs were scattered along the Mississippi River as far south as St. Louis. The logs were later picked up by the company owning them and sold in the towns along the river. Before this no rafting of logs down the river had been done, and little was known of long drives; but from this time on log rafts were seen in increasing numbers each year. The camps which were be-

ing abandoned in central Wisconsin moved northwest into Minnesota. By 1890 the section of country for a hundred miles around Minneapolis was swarming with lumberjacks. Scientific methods of handling lumber and logs came into use. The slow oxen which were used to haul the logs were replaced by draft horses. New mills were built at St. Anthony Falls, and elsewhere, and the whole territory took on a new aspect of industry on a modern scale. The expense of building dams, spillways, and booms was large, and took a great deal of capital. Once the large mills began to run, profits were rapidly realized, and the prosperity of the city grew enormously. Lumber was rafted or shipped down the river or shipped to the eastern markets. There was plenty of it, and it was the one important resource that Minnesota depended upon for its rapid early growth.

Influence of the Wheat Fields. After the lumber industry began to decline, wheat-growing became the important occupation. Even before the lumber industry declined, the vast, fertile wheat fields of the Northwest were being broken up. The industry spread rapidly to the west and north into North Dakota, and Canada, so that by the latter part of the nineteenth century millions of bushels of wheat were being raised every year. This great, fertile area proved to be an excellent region for wheat-growing. The rain-fall varies from twenty-seven to thirty inches in Minnesota, and from twenty-two to twenty-five inches in the Dakotas and southern Canada, but the moisture comes in the growing season when it is most needed. The evaporation at this time of the year is moderate, so that even this amount of rain-fall is sufficient for wheat-growing. When the wheat begins to ripen the weather is dry, an excellent condition for the hardening of the grain.

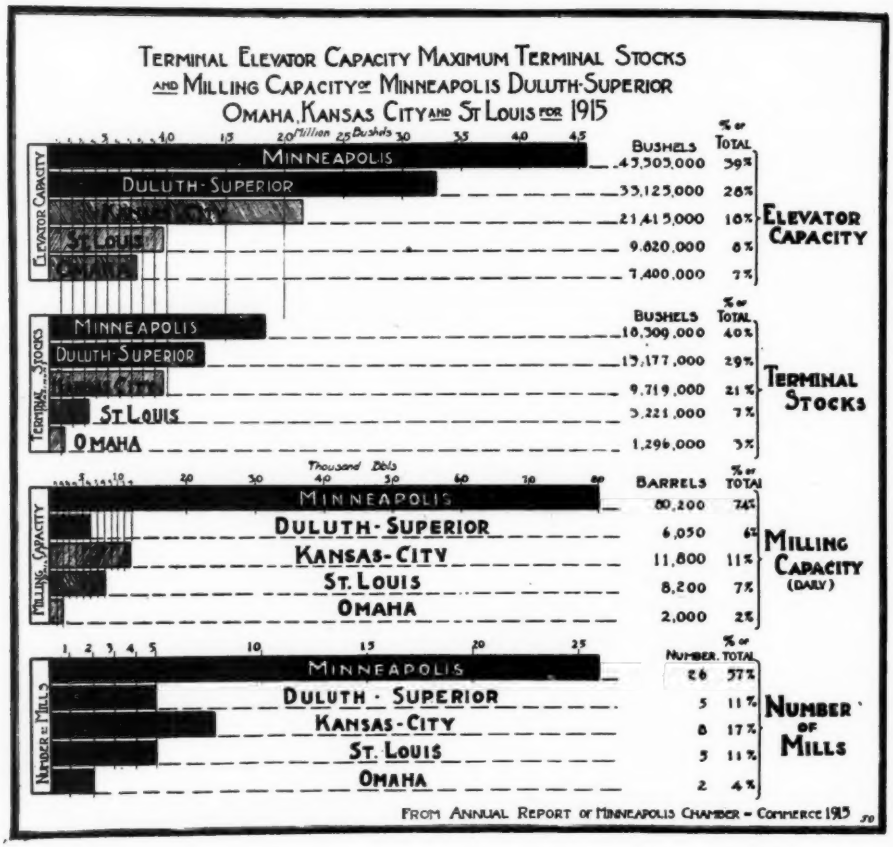
In 1905 South Dakota produced 44,000,000 bushels of wheat, Minnesota 72,000,000 bushels, and North Dakota 75,000,000 bushels. A small quantity of this wheat moved over the southern railroads to Chicago, and some over the northern route thru the Great Lakes; but by far the greater portion went to Minneapolis to be stored and ground into flour. In 1910 Minnesota alone produced 94,000,000 bushels, and in 1918 the three states of North Dakota, South Dakota, and Minnesota combined produced more than one-fourth of the entire crop of the United States, or a total of over 250,000,000 bushels.

For a few years elevators could not be built fast enough to take care of the grain. However, in 1920, 55,000,000 bushels of grain could be stored at one time, and the capacity has increased since that date. Chicago is the only grain center in the United States whose terminal capacity approaches the capacity of Minneapolis.

Besides the large elevators in the city of Minneapolis, there are 4300 independent elevators which are operating in a local capacity thruout the Northwest. These smaller companies contract with the farmers for their grain, and send it to Minneapolis to be sold.

The Flour Milling Industry of Minneapolis. As a result of the enormous amounts of grain coming to Minneapolis, the flour-milling industry grew

rapidly. Today the twenty-three large flour mills can grind 93,000 barrels of flour a day, which amounts to about $70,000,000 worth annually. The expense of grinding the wheat in this city is again cheapened by the nearness of the mills to the grain elevators, and to the water power. The transfer of wheat from the elevators to the mills is only a matter of a few hundred feet. As a result of these factors and with the aid of human agencies, Minneapolis has become the largest flour-milling center in the world.



We must attribute the growth of this industry at this particular place to the presence of water power. It is really difficult to say what would have been the development of Minneapolis had it not been for the water power. One author says, "It was the combination of cheap power, the northern pineries on the river above, and the grain fields of the Northwest that determined the location of the city." At least it is safe to say that the wheat and lumber might not have stopped at Minneapolis if it had not been for the cheap power.

General Manufacturing. The city is favorably located with regard to raw materials, power, and markets. It is the gateway to a region of 400,000 square miles, and of 5,000,000 inhabitants. This region makes use of a great many kinds of farm machinery and tools. It is a natural result that Minneapolis should handle a large part of this trade. The city is said to be the largest distributing center in the United States for tractors and agricultural implements.

Minneapolis is also located on the edge of the flax-growing region, which ranks as the largest linseed-producing center in the country, its mills having a capacity of 4,800,000 bushels of flax, producing 700,000 barrels of oil, and 300,000 tons of cake per year.

There are many other industries which amount to over $10,000,000 each per year.

ST. PAUL

The early history of St. Paul varies little from that of Minneapolis. Both cities were settled at about the same time. Father Hennepin, the priest-explorer who first went to Minneapolis in 1679, came to St. Paul in 1680. During the first few years St. Paul grew faster than its sister city, due to the large trade that came up the river to the foot of the falls.

By 1847 river packets began to run regularly between St. Paul and St. Louis. This had a great influence on the growth of the community, and by 1849 St. Paul had a population of 840. In the next ten years the city was so busy that more than half of the men were engaged in construction work. Small shops sprang up and began to use skins and furs in the manufacture of clothing. Lumber began to come down the river, and more settlers moved in to take advantage of the wealth offered by the forests. St. Paul was located at the northern-most point reached by goods moving up the river, so it became the distributing center for supplies and tools especially those to be used by the lumberman in equipping the lumber camps. In the next ten years St. Paul attained a population of 12,000, which was doubled in the following decade.

By 1870 both Minneapolis and St. Paul were flourishing cities of more than 25,000 each, with Minneapolis a little in the lead. The fur trade came to St. Paul because of its position on the river at the head of navigation. At the present time sixteen firms are working up 2,000,000 furs every year, making St. Paul one of the leading centers of high grade furs in the United States.

A Dairy Center. As Minneapolis is the wheat center of the Northwest, St. Paul is the dairy center. It is the second largest butter-producing city in the United States. The cream is shipped in from thousands of small stations thruout Minnesota. The many railroad lines coming into St. Paul from every direction make it possible for this cream to be delivered every day, and on the same day that it is separated. In 1919, 25,000,000 pounds of butter were made in this city.

The Live Stock and Meat Packing Industry. Thousands of cattle, hogs, and sheep are annually shipped to South St. Paul. The packing houses of this part of the city cover 250 acres. The area is flat, and the conditions are favorable for the building of large stockyards and packing houses.

A Manufacturing and Distributing Center. Ever since supplies were brought up the Mississippi River to be sold at the trading post, St. Paul has been a supply station and distributing center for the territory included in the Dakotas, Montana, and Minnesota. The largest shoe-manufacturing establishments of the Northwest are located where the old trading post was.

St. Paul is the hardware center of the Northwest. Thirty acres of floor space are used by the jobbers in assembling machines and tools, to be sent to the western farmers. A few lines of machinery are manufactured in St. Paul, but the greater number are made in the eastern cities and sent to St. Paul for assembling and distributing.

It must be understood that St. Paul is primarily a distributing center and market, and not an industrial city, and so the lack of many large manufacturing plants is not felt as a drawback in the development of the city. However, as the Northwest fills up and the market for manufactured articles and demand for them increases, St. Paul is likely to be the location of large factories.

CONCLUSION

Twenty-five years ago St. Paul and Minneapolis were two distinct cities, having separate interests and developing under separate conditions. Minneapolis developed because of the water power, and its lumber resources at its door, while St. Paul grew because of the influence of its position as a trading center at the head of navigation on the Mississippi. At the present time, however, a stranger cannot distinguish between the two cities. There are no rural tracts between; the same street cars operate in both cities. In other words the cities really form one city of somewhat more than 600,000 inhabitants.

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ST. LOUIS

ELMER H. JOHNSON

In a study of the geographic factors influencing the economic development of St. Louis, we want to know how man has utilized the natural conditions of the Mississippi Valley in producing a great city. Thruout its steady growth St. Louis has served this region, and it has been upon the extent of this service from the time of the fur trader to the present, that the growth of the city has depended.

THE LOCATION OF ST. LOUIS

St. Louis is near the geometrical center of the vast agricultural section of the Mississippi drainage basin. That it is near the mouth of the Missouri and of the Illinois was obviously a very important factor when the only means of commerce of the region was by water transportation. Now, however, it is an important railway center. The city occupies a central position in the producing areas of such agricultural products as corn, wheat, cattle, swine, horses, and mules. It is obvious that St. Louis should be a marketing center for these farm products as well as a distributing point for the population which depends upon the production and marketing of these agricultural commodities. South of Missouri is the cotton belt, and as long as the agriculture of the cotton belt remains of the one-crop type, its people will require large quantities of meats and other foodstuffs from the central states. Prior to the coming of the railroads, St. Louis occupied a superior position as a collecting and distributing point for these commodities.

THE EARLY DEVELOPMENT OF ST. LOUIS

The key to the growth of St. Louis has been its location in the center of the great agricultural area of the interior of the United States—now one of the most important in the world. However, the early growth of the city was a response to its advantageous position in the Mississippi River system, when the main business of the valley was the exploitation of the fur resources of the West. In 1763 Pierre Laclede ascended the Mississippi from New Orleans in search of a commercially strategic point where he might build a fur-trading post which would tap the fur-producing areas lying to the westward. After careful consideration of various sites, Laclede chose the present site of St. Louis as the best for his purpose. The party landed near the mouth of a small stream, later known as Mill Creek. Here was a good landing place, for the water next the shore was deep. Back from the banks of the Mississippi the surface rose by a series of benches so that it was safe from floods. The adjacent area was well timbered, and the little stream fed by springs had fall enough to be utilized for water power.

RELATION TO THE FUR-TRADE AND THE WESTERN TRAILS

The post was started early in 1764, and fur-trading was important from the beginning. After the return of the Lewis and Clark Expedition, hunters

and trappers flocked into the great Northwest. Fur companies were organized, and the gathering of furs was carried on in a systematic fashion. At this stage, as at later stages, geographic factors made their influence felt, and the whole Northwest as far as the northern Rockies may be likened to a great funnel which converges at St. Louis. "Every route of trade or adventure to the remote regions of the West centered in St. Louis." By the time the steamboats appeared on the upper Mississippi in 1817, St. Louis was easily the most important collecting point for the West, and was also the leading outfitting point for trader and trapper. Not only were the rivers used in exploiting the western country, but wagon trails were used as well. The historical Oregon Trail began as an independent line of travel near the present site of Kansas City, and brought to St. Louis furs from the high mountains of the Northwest, from the Great Basin region near Great Salt Lake, and to some extent from the valleys of the Pacific Ranges of the far Northwest. To the southwest ran the Santa Fe Trail which left the Missouri River at the site of Independence, and brought St. Louis into commercial contact with the distant provinces of old Mexico and even of southern California. With its growth as a market for the raw materials of the West, came an increasing importance as a great outfitting post. Altho the fur-trade had reached its maximum before 1840, it persisted for many years as an important industry, and, due to various factors, St. Louis is at present the chief market for raw furs in North America.

RELATION TO AGRICULTURE AND TO RIVER TRANSPORTATION

In 1821 the first state west of the Mississippi had acquired sufficient population to be admitted into the Union, and a beginning in farming had been made in the Missouri Valley. The surplus products of these farms passed thru St. Louis to be distributed in the South. Agricultural products are bulky and of relatively low value per unit weight. The main agricultural development west of the Mississippi awaited the coming of the railroads, because water transportation was too inefficient. On account of the topography, access to the river landings was often difficult, and even when goods were on the boats there were the dangers attending the navigation of the rivers. In addition there were often high monopolistic rates demanded by the river carriers; and during the winter river transportation was entirely closed. The first railroads had reached St. Louis from the east prior to the Civil War, and some roads had been built in Missouri. During the war period the river fleet was depleted and was never replaced. With the construction of more railroads, the lines of traffic from St. Louis were extended in all directions which was quite a contrast to the general north-south line of the era of river transportation. Accordingly the city was forced to adjust itself to the new conditions.

RECENT CONDITIONS

The growth of St. Louis has depended upon its service to its tributary area: (1) as a great collecting and outfitting point for the lucrative fur trade; (2) as a marketing and distributing point for the agricultural products of the central Mississippi Valley; (3) as a point for distributing commodities (a) to the South, particularly prior to the Civil War, and (b) to the agricultural population of the West and Southwest; (4) as a manufacturing center in the central Mississippi Valley.

In the early days of St. Louis, manufacturing was rather primitive or entirely neglected, due to the competition of the fur trade. Before the Civil War there had been considerable flour-milling and pork-packing carried on in a local way, and the surplus products found a ready market in the South. Since the Civil War the growth in manufacturing has been steady, and in 1914 the order and value of the manufactured products of St. Louis were as follows:

1.	Slaughtering and meat packing	$36,634,000
2.	Boots and shoes	31,049,000
3.	Malt liquors	26,829,000
4.	Printing and publishing	18,026,000
5.	Foundry and machine shop works	13,785,000
6.	Coffee and spice roasting and grinding	11,972,000
7.	Mens clothing	10,273,000
8.	Bread and bakery products	9,454,000
9.	Patent medicines, drugs, etc.	7,769,000
10.	Stoves and furnaces	7,479,000

There are several minor manufacturing industries using hardwoods for such purposes as carriages and wagons, cars, cooperage stock, furniture, and lumber products. These industries just named are clearly a response to the presence of the hardwood forests of the central Mississippi Valley and to the requirements of a farming region. Other minor industries produce leather goods, automobile parts, wire work, copper and sheet iron materials, and paints. Some of the factors from the standpoint of accessible raw materials which have occasioned this diversity of manufacturing industries are: (1) The presence of bituminous coal in large amounts and of other minerals accessible for industrial purposes, has resulted in (a) smelting and refining of copper, lead, and zinc; (b) marble and stone work; (c) iron and steel, and blast furnaces; (d) glass and paint industries. (2) Extensive timber areas which are commercially accessible. From the standpoint of markets for manufactured products the following factors have aided in the development of St. Louis: (1) the location of the city in the midst of a great agricultureal region with a diversity of markets; and (2) excellent shipping facilities.

Another important factor, favoring manufacturing in St. Louis, is the cheaper food supply when compared with the living costs of workers in

Massachusetts for example, because of the long hauls of a very large part of the foodstuffs used in New England. The business of slaughtering and meat-packing is clearly a response to the marketing of live stock which is produced in the area tributary to St. Louis. That it is economical to ship the live animal only the shortest necessary distance is evident when we consider that a live steer in good condition produces dressed meat weighing only about 550 pounds. Economical packing of the dressed meat in refrigerator cars further reduces the cost of transportation.

The making of shoes in St. Louis has been an important industry for years, and its growth indicates a tendency of a manufacturing industry to spread in certain cases towards the markets which take their products. The first successful plant for making boots and shoes in St. Louis is said to have been run by experienced workers brought from Rochester, New York.

The paint industry appears to be the result of utilizing some of the by-products of the smelting of lead which has long been important in south-western Missouri, coupled with the active demand for paints required for houses, barns, fences, and farm implements in the central United States.

The manufacture of drugs and chemicals is said to have secured its first impetus from the demands for patent medicines for the outfitting parties of the early western trade.

In passing, it may be noticed that St. Louis is one of the largest horse and mule markets in the world. These animals are produced in the tributary region and most of the mules are collected here for use in the cotton districts of the South.

SUMMARY

The great impetus given the economic growth of St. Louis was made by the fur-trading activities of the West prior to 1840. Then it became a marketing and distributing point for the agricultural products of the central Mississippi Valley. At present the chief importance of the city arises from its central location, and its business as a distributing point for the Southwest, and to its manufacturing interests which include a diversity of enterprises.

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SEATTLE

GUY HAROLD SMITH

GENERAL GEOGRAPHY

The city of Seattle has become the metropolis of the northwest and the commercial center of Puget Sound. Why has this city surpassed Tacoma, Portland, Olympia, and others that started at about the same time? Is there anything in its geography to explain this rapid growth or is it the result of a deliberate attempt on the part of the inhabitants to make Seattle the chief city? Both no doubt have been significant, and without forgetting the human factor, the geographic influences will be considered and their importance examined.

Seattle, no doubt, enjoys a unique position, but it is not strikingly superior to that of many other cities. Tacoma and Olympia are at the southern limit of Puget Sound and enjoy a deep, unobstructed waterway to the sea. Port Townsend is on the west side of the entrance; opposite and south is Everrett, and farther north and on the east is Bellingham. Once these cities could have been competitors of Seattle, but only Tacoma can claim that distinction now (See map).

Seattle is situated on a narrow neck of land between Lake Washington and Elliott Bay, an indentation of Puget Sound. The city is 135 miles from the Pacific with not a bar to obstruct the waterway. The main part of the city is built on the high elevations and the swampy areas are being reclaimed for the sites of factories.

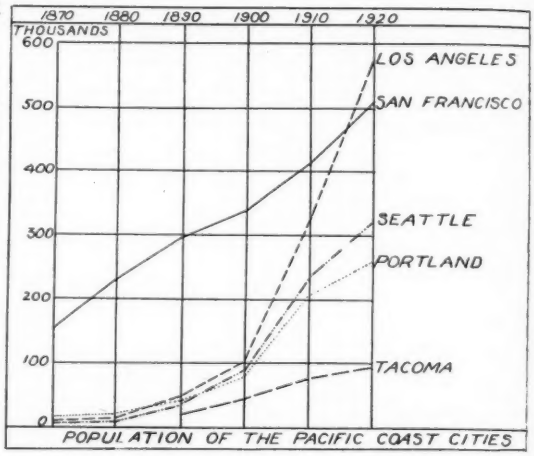
HISTORY

The history of Seattle is necessarily brief, for it is one of our youngest cities. Whether this fact has any significance may be debatable, but in a city as young as this, tradition and community custom can play but little part in municipal policies.

In 1850 New York had a population of over 515,000, Philadelphia more than 340,000, Baltimore about 169,000, and boston a little less than 140,000, but Seattle was then a part of the virgin forest. Today San Francisco and Los Angeles are the only Pacific Coast cities with larger population than

Seattle, which now has reached 315,000 (See graf). This is less than that of New York or Boston in 1850. However, this year marked the founding of this new commercial city. "John Holgate was the sole inhabitant in 1850; the Denny party came in 1851, and when a few months later, Yesler started a sawmill, Seattle gave promise of being a typical 'sawdust and salmon' town."

The Denny party consisted of David T. Denny and Arthur A. Denny, and three children of the latter. They were natives of Illinois and had crossed the plains and mountains to Portland. This was not wild enough to suit these young men, so they pushed on to Seattle. The family of Arthur A. Denny and twenty others came November 13, 1851, to join the Denny brothers. This was the first permanent settlement on the site of the present city of Seattle, which was immediately called New York after the eastern metropolis.



There was high anticipation on the part of the hardy pioneers; they dreamed of a great city, and in February, 1852, a party of men with horse-shoes and clothes lines sounded Elliott Bay to determine whether it would serve as a harbor for large vessels; and needless to say, they found the water conditions adequate to meet the demands of a large port. The town was soon called Seattle after a friendly Indian chief, and on January 6, 1853, the legislature of the Oregon Country passed a law making Seattle the county seat of King County.

The rapid in-rush of miners and prospectors to the Indian lands led to the Indian Wars of 1852. Seattle did not escape the menace, and suffered slightly as a consequence. The sloop-of-war, Decatur, then anchored in Seattle harbor, gave valuable aid in repulsing the Indians. The little town grew steadily as a lumbering and fishing center, and felt so much its importance that it was incorporated as a city in 1869 with a population of about a thousand people.

The next important event was the coming of the railroad. The Northern Pacific surveyors had been searching the Cascades for the lowest passes, and the final choice of a pass meant that either Seattle or Tacoma would get the railroad. Tacoma won, but rivalry did not last long, for a year later (1884), Seattle was connected with the main railroad.

Nearly every great city boasts of a fire. There is the destructive aspect, but time generally shows a fire to have been a blessing to a city. Seattle is

no exception to this, for in 1889 the business district was wiped out. The recovery has been complete, and the city really boasts of its fire.

In 1896 the first direct steamship connection with the Orient was established; the first gold from Alaska came in 1897 and made Seattle the headquarters of the gold seekers; 1909 the Alaska-Yukon-Pacific exposition advertised to the world the city of Seattle; the opening of the Lake Washington canal in 1917 gave the city a fresh water harbor; and the government shipyards were established during the war. These are the major events in the growth of the city in recent years.

THE GEOGRAPHIC FACTORS

It is with the geographic factors that this paper is particularly concerned. The general geography and history lend perspective to the setting, so that the geographic influences may be seen in their true light. With total disregard for history, which is a record of human events, a mere study of geographic factors might result in over emphasis and misplaced credit.

Advantage of Position. The general location of Seattle is very advantageous, and this is shared in some degree by all of the ports of the Puget Sound district. The very fact that Seattle is in the northwest corner of the nation places it nearer to Alaska than any other large city. Since the earth is a sphere, Seattle has the advantage of lying near the great circle route from our west coast to the Far East. This gives Seattle an advantage of one to three days over San Francisco. In fact, Seattle is nearer to all ports of the Orient north of Singapore than is San Francisco, but this northern route is less attractive to travelers than is the route by Hawaii.

The Harbor of Seattle. Seattle is essentially a commercial city, and from all indications its future lies in the forwarding function. Whatever other advantages it may possess, it is doubtful if Seattle could have become the city it is today except for its splendid harbor.

Elliott Bay forms the major part of the outer harbor which is about the same in area as Upper Bay, New York harbor. The water is so deep that there is no danger of shoals; in fact, the city has found it necessary to furnish special anchoring buoys for the ships. Their anchor chains are not long enough to reach bottom. A part of Salmon Bay and the tidal marshes of Duwamish River form the remainder of the tidal harbor.

In 1917 the government completed the Lake Washington canal and locks, connecting Salmon Bay and Lake Union, and giving to Seattle a fresh water harbor. The large lock will accommodate any ship up to 750 feet, lifting it from salt to fresh water in five to twenty minutes.

The Tributary Area. The Puget Sound area is a great valley between the Olympics on the west and the Cascades on the east. This region is not particularly endowed with fertile soil, but the adjacent farm lands supply wheat, fruit, and dairy products to the urban population. Outside of the

valley, in eastern Washington wheat enters into commerce thru the port of Seattle. The forests of Washington have supplied lumber for the homes of the people, and the lumbering industry employs more men than any other manufacturing industry.

Not only does the land give forth products to make Seattle an important city, but the adjacent waters have added to its wealth. The fishing grounds within the corporate limits of the city are of little importance, but Seattle is the home port of many fishing craft. The boats at anchor with their masts in silhouette against the sky recall the days of cod fishing along our north Atlantic coast.

Nearness to Power. Seattle does not lack power, for Washington produces enough coal to meet the demands of its industries with an exportable surplus for other coast states and for bunkerage. Washington leads all other states in the available hydro-electric power, a large amount of which is within easy reach of Seattle.

Commercial Relations

With total disregard of the countries with which Seattle has its trade relations, the factors just enumerated would lose some of their significance. If the Orient, Alaska, and Canada were barren, uninhabited lands Seattle would be little more than a struggling city. But because of the mineral wealth of Alaska and the great resources of the Orient Seattle claims resources outside its corporate limits.

Commerce and Industry

The geographical location of Seattle on one of the finest natural harbors, and the excellent port facilities have built up an important commerce. Coupled with these factors is the advantage of four competing transcontinental railroads having terminals at Seattle.

The foreign commerce of the Puget Sound Customs District, of which Seattle is the chief port, is over 475 million dollars annually, a little less than the commerce of San Francisco.

The principal exports in the order of importance are raw cotton, cotton cloth, machinery, iron bars, leather and manufactures, tin plates, lumber, and canned salmon. In these one can see the demands of the Orient for American products.

The imports in order of value are vegetable oils, crude rubber, copper, bags and burlap, tin, beans, copra, tea, and hemp. The increased demand for vegetable oils to replace the animal fats, and America's colossal automobile industry explain the enormous trade in oils and rubber.

Seattle is essentially a commercial city and the geographic factors point toward a commercial rather than industrial expansion. But no city can remain absolutely commercial for manufacturing develops as a result of trade.

In 1910 the principal industries were lumber and timber, slaughtering and meat packing, foundry and machine shops, and printing and publishing.

Manufacturing no doubt will increase with the commerce but not at the same rate.

SUMMARY

The factors that are responsible for the growth of a city can hardly be evaluated because they change in importance, but the following is a list of the influences that have contributed to the growth of Seattle: (1) large deep harbor with ample dockage; also a fresh water harbor; (2) commercial resources of Far East, Alaska, and Puget Sound region; (3) advantage of the shorter route to Alaska and the Orient; (4) at the break in commerce, 135 miles from the open sea; (5) four competing transcontinental railroads; (6) sustaining resources of adjacent area—food resources, lumber, fish, coal, water power; (7) suitable climate; (8) near the productive west; (9) near power; (10) spirit of the people.

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POPULATION OF CITIES HAVING 100,000, OR MORE, INHABITANTS IN 1920

New York	5,620,048	Portland, Ore.	258,288	Scranton	137,783
Chicago	2,701,705	Denver	256,491	Grand Rapids	137,634
Philadelphia	1,823,779	Toledo	243,164	Paterson	135,875
Detroit	993,678	Providence	237,595	Youngstown	132,358
Cleveland	796,841	Columbus	237,031	Springfield	129,614
St. Louis	772,897	Louisville	234,891	Des Moines	126,468
Boston	748,060	St. Paul	234,698	New Bedford	121,217
Baltimore	733,826	Oakland	216,261	Fall River	120,485
Pittsburgh	588,343	Akron	208,435	Trenton	119,289
Los Angeles	576,673	Atlanta	200,616	Nashville	118,342
Buffalo	506,775	Omaha	191,601	Salt Lake City	118,110
San Francisco	506,676	Worcester	179,754	Camden	116,309
Milwaukee	457,147	Birmingham	178,806	Norfolk	115,777
Washington	437,571	Syracuse	171,717	Albany	113,344
Newark	414,524	Richmond	171,667	Lowell	112,759
Cincinnati	401,247	New Haven	162,537	Wilmington	110,168
New Orleans	387,219	Memphis	162,351	Cambridge	109,694
Minneapolis	380,582	San Antonio	161,379	Reading	107,784
Kansas City, Mo.	324,410	Dallas	158,976	Fort Worth	106,482
Seattle	315,312	Dayton	152,559	Spokane	104,437
Indianapolis	314,194	Bridgport	143,555	Kansas City, Kan.	101,177
Jersey City	298,103	Houston	138,276	Yonkers	100,176
Rochester	295,750	Hartford	138,036		

NUMBER OF CITIES OF 25,000 INHABITANTS OR MORE IN EACH GROUP OF STATES IN 1920

New England	46	East South Central	11
Middle Atlantic	63	West South Central	17
East North Central	73	Mountain	7
West North Central	21	Pacific	18
South Atlantic	31	Total number	287

GEOGRAPHICAL PUBLICATIONS

Carle S. Salter. **The Rainfall of the British Isles.** 295 pages, 111 maps and diagrams. University of London Press, 1921. 8/6 net.

The volume summarizes the conclusions reached by the author after twenty-four years service with the British Rainfall Organization. Its purpose is to bring together the general conclusions so far deduced; to suggest a working hypothesis for future students to build upon or to amend; "and to draw attention to the economic utility of a more complete knowledge of our resources in respect of one of Nature's greatest gifts."

An analysis of the processes of rain formation is followed by four chapters on the mechanics of gathering rainfall data. Six chapters are devoted to methods of mapping rainfall data; the incidence and frequency of daily rainfall; seasonal variations in rainfall; fluctuations of annual rainfall; and relation of rainfall to configuration of the land. A thorogoing discussion of types of regional distribution, with numerous maps to illustrate the types, is presented in two chapters. One short chapter discusses the economic application

of rainfall data. It is unfortunate that this important chapter is so limited in its suggestions since the making of rainfall data *function* in life interests is of such vital importance. The volume brings together in an organized form a body of material of great value to every student of Britain. It will undoubtedly become one of our standard references.

G. J. M.

Nellie B. Allen. **Geographical and Industrial Studies. North America.** 391 pages, 102 photographs and maps. Ginn & Co., New York. 1922. $1.00.

Miss Allen's excellent book is intended as a supplementary reader, presumably for the fifth and sixth grades. It is organized on the regional basis. The author has endeavored to have the child appreciate the effect of environment on life as she takes him thru one region after another thruout the continent. The absence of good physical maps, and other maps showing other elements of the environment, is a serious defect and a handicap in carrying out effectively the theme of the book. There are four maps of so called "natural regions," but since these maps are almost wholly disregarded in the organization of the material and in the text discussion one wonders whether the author considers them impracticable or useless. One also wonders why they were included, as good physical maps carrying names of the regions discussed, would have been more useful. Notwithstanding these defects the book is a very desirable one for school use.

G. J. M.

Richard Peters. **Two centuries of Iron Smelting in Pennsylvania.** 83 pages, 64 photographs and drawings. Pulaski Iron Company, Philadelphia. 1921. Free.

"Two Centuries of Iron Smelting in Pennsylvania" was issued "to commemorate the closing of two hundred years of successful development of the pig iron industry in Pennsylvania," and for advertising purposes. The author has outlined the history of iron making in the state and has included numerous illustrations of furnaces and mills showing various stages in the evolution of the industry. Teachers will find the book very interesting, highly instructive, and very useful in the upper grades or junior high school. It belongs to that rare, high grade, refined, and unobtrusive type of advertising that commends itself to the educational world because of its intrinsic value. It is the type that will remain a permanent library accession.

G. J. M.

W. R. Kermack. **The Expansion of Britain from the Age of the Discoveries.** Subtitle, A Geographical History. 112 pages, 12 maps. Oxford University Press, New York. 1922.

As a geographic-historic account of the evolution of the British Empire this little book is highly interesting and instructive. It attempts "to look, from a geographical point of view, at the history of the settlement and growth of the Dominions . . . , and the foundation and expansion of the Indian Empire." It covers the period from the Tudors to the present and discusses some of the geographical and historical factors in present-day problems of the Empire. The author has condensed a large amount of material into the eight chapters titled as follows: The Age of the Discoveries; How Britain Became a Sea Power; British North America; The Indian Empire; The Union of South Africa; The Commonwealth of Australia; the Dominion of New Zealand; The Sea-Ways of the Empire.

G. J. M.

John van Schaick. **The Little Corner Never Conquered: The Story of the American Red Cross Work for Belgium.** 282 pages, 9 photographs. Macmillan Co., New York. 1922. $2.00.

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